



Before

Independent Commissioners appointed by Tasman District Council

**IN THE MATTER**

of the Resource Management Act 1991

**AND**

**IN THE MATTER**

of an application by CJ Industries Ltd for land use consent RM200488 for gravel extraction and associated site rehabilitation and amenity planting and for land use consent RM200489 to establish and use vehicle access on an unformed legal road and erect associated signage

**EVIDENCE OF DR WILLIAM HENRY KAYE-BLAKE ON BEHALF OF CJ INDUSTRIES LTD REGARDING ECONOMIC IMPACTS**

**15 July 2022**

**1. INTRODUCTION**

- 1.1 My full name is Dr William Henry (Bill) Kaye-Blake. I am a Principal Economist at the New Zealand Institute of Economic Research (NZIER).
- 1.2 The applicant has applied for resource consents authorising the extraction of gravel, stockpiling of topsoil, and reinstatement of quarried land, with associated amenity planting, signage and access formation at 134 Peach Island Road, Motueka:
  - (a) RM200488 land use consent for gravel extraction and associated site rehabilitation and amenity planting and
  - (b) RM200489 land use consent to establish and use vehicle access on an unformed legal road and erect associated signage.
- 1.3 My evidence addresses the economic assessment of the activities for which consent is sought.

## **Qualifications and Experience**

- 1.4 My qualifications include a PhD in Economics from Lincoln University, which I obtained in 2006. I hold a Master's degree from the University of California, Davis and a Bachelor's degree from the College of William and Mary in Virginia. Prior to my current role I was a Director and later Chief Economist at PricewaterhouseCoopers in Wellington, from 2014 until 2019. I was a Principal Economist at NZIER from 2010 until 2014. Alongside these positions, I have been an Honorary Associate Professor at Lincoln University since 2010, after having worked at Lincoln University from 2002 until 2010.
- 1.5 My technical skills and experience directly relevant to my assessment include:
- (a) Conducting cost-benefit analysis for business and government, including the Ministry for Primary Industries and Pipfruit New Zealand
  - (b) Conducting computable general equilibrium modelling for business and government, including the Ministry for Primary Industries and New Zealand King Salmon
  - (c) Conducting cost-benefit analysis and economic modelling in the context of applications under the Resource Management Act. I have produced economic evidence for the Environmental Protection Authority, New Zealand King Salmon and Trans-Tasman Resources.
- 1.6 I have not undertaken a site visit in the preparation of this evidence.

## **Purpose and Scope of Evidence**

- 1.7 The purpose of my evidence is to assess the economic effects of the proposal, including market and non-market effects.

## **Code of Conduct**

- 1.8 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014 and I agree to comply with it. My evidence is within my area of expertise, however where I make statements on issues that are not in my area of expertise, I will state whose evidence I have relied upon. I have not omitted to consider

material facts known to me that might alter or detract from the opinions expressed in my evidence.

## 2. EXECUTIVE SUMMARY

2.1 CJ Industries has applied for consent to extract aggregate at a Peach Island site. Experts have assessed the proposal and provided information on the environmental and social impacts of the activity. Economic information has been provided by CJ Industries. Additional data has been obtained from Statistics NZ, the Reserve Bank, NZ Petroleum and Minerals and other sources. I have also relied on the evidence of other experts, as cited in my evidence. The data have been analysed using a cost-benefit analysis (CBA). Additionally, the economic impacts on Tasman District have been estimated using a computable general equilibrium model of the New Zealand economy.

2.2 The Resource Management Act mentions economic, environmental, social and cultural impacts. The present CBA has considered:

- (a) economic impacts of the application
- (b) environmental impacts associated with greenhouse gas emissions
- (c) social impacts from noise and traffic.

Other environmental and social impacts as well as cultural impacts have not been included in this analysis. They could be included in an amended CBA once the impacts are identified and quantified.

2.3 CJ Industries has applied for consent to extract aggregate at a Peach Island site. The economic benefit arises from having a local source of aggregate, and the environmental benefit arises from reduced emissions from cartage of low-value, high-bulk material. The economic cost is loss of pastoral production for 15 years. No other economic, environmental, social or cultural impacts are included in this analysis. The total annual economic benefit is valued at \$306,000, and the total annual economic cost is \$970. The annual environmental benefit from reduced GHGs is valued at \$21,400. The net benefit of the proposed activity over 15 years is \$3.56 million.

### 3. EVIDENCE

#### Scope of evidence under the RMA

3.1 I have conducted a cost-benefit analysis (CBA). The process for a CBA involves identifying impacts, estimating the value of those impacts, establishing the timing of the impacts, calculating the net present value of the impacts, and finally summarising the impacts as net benefits. Impacts can be organised into economic, environmental, social and cultural impacts. These categories reflect the Resource Management Act 1991 (the RMA), which defines sustainable management of the environment, in s5, as enabling people and communities to provide for their social, economic, and cultural well-being while achieving specified environmental outcomes and managing effects. The RMA also offers a broad definition of environment, in s2, noting that it includes:

*(a) ecosystems and their constituent parts, including people and communities; and*

*(b) all natural and physical resources; and*

*(c) amenity values; and*

*(d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) or which are affected by those matters.*

3.2 When doing a CBA, it is necessary to draw a notional boundary around the project to designate what is included and excluded. One potential boundary is a commercial one: the project as a commercial endeavour. A CBA with that boundary can answer the question, is the project worthwhile from a business perspective? An assumption for this evidence is that the project is commercially worthwhile and its viability does not need to be investigated. CJ Industries Ltd will already have made that assessment, because they are pursuing consent to undertake the project and paying for all the experts. This analysis does not assess the costs of gravel extraction, site rehabilitation, forming a road, truck movements, bridge upgrade, signage and amenity planting. The value of volunteered conditions is also not assessed here, because it is assumed that the company has already assessed their impacts on the commercial viability of the project and deemed them acceptable.

3.3 A different boundary for a CBA is used in this analysis and is the one drawn by the RMA. It is focused on the wider impacts of a project or application beyond the

commercial interests of the applicant. For economic effects, the boundary is the wider economy, including upstream and downstream industries, household welfare and employment effects. Geographically, the most important effects are likely to be local. A CBA for RMA purposes can answer the question, *is the application a net positive for the economy, society and the environment, especially at a local level?*

### **Existing environment**

- 3.4 My understanding of the existing environment is based on documents available, including the Application and the Section 42A report. I understand that the site is in rural Tasman District beside the Motueka River. There are three stages, with two stages protected by stopbanks and one stage outside the stopbank. The land is relatively flat, and land in the area is used for pasture, horticulture and rural residential living. The soil is classed as Class A productive land although there is evidence that the soil quality affects its productivity and versatility. The applicant has conservatively estimated that there is between three and four metres of aggregate between topsoil and a buffer above groundwater. The surrounding area includes pasture (some of which appears to dry off so may not be irrigated) and orchards, as well as residential properties and forestry.

### **The proposal**

- 3.5 I understand that the application is to undertake gravel extraction. The site is approximately 7.4 hectares, split into three stages. Consent is sought for a period of 15 years. Extracted gravel will be hauled offsite; no processing or crushing will occur on site. A process has been developed that will set aside the topsoil, extract the gravel, replace the gravel with cleanfill and replace the topsoil. This will happen continually during the process of excavation, so that the size of the pit never exceeds 1600 m<sup>2</sup> or 0.16 hectare. The extracted aggregate has several uses, including in ready-mix concrete and chip seal (Corrie-Johnston, 2022).
- 3.6 The application includes conditions related to operating hours, vehicle movements, signage, amenity planting, stormwater management, and monitoring of noise, water, and cultural discoveries.
- 3.7 The application describes the core of the economic question: Gravel is in high demand and has a high value because of regional growth and limited supply throughout the region; however, the majority of the available gravel material from Douglas Road is near

to being exhausted. Accordingly, the Applicant wishes to apply for further resource consents in order to extract gravel material for high end use such as concrete, seal chip and roading projects in the Tasman region (*Application for Resource Consent by CJ Industries, RM200488*, 2020, p. 5; Corrie-Johnston, 2022, p. 2).

### **Potential effects on the economy**

- 3.8 The core of the economic impacts concerns the aggregate to be extracted. This aggregate is used in the local economy for concrete, seal chip and roading. Aggregate is a high-bulk, low-value commodity (New Zealand Infrastructure Commission, 2021), so having supplies within a short distance of its final use is considered important for construction and roading. It is commonly stated in New Zealand that the price of aggregate doubles when it is hauled 30 kilometres from its source quarry (Aggregate & Quarry Association, 2021; NZIER, 2013). Additional costs flow through the rest of the economy, first to concrete then to building, wholesaling, retailing, etc. Aggregate and concrete are widely used, so the cost impacts will be widely distributed. Physical material is a major input and cost for construction projects (New Zealand Infrastructure Commission, 2021).
- 3.9 The analysis considers two scenarios. In the first scenario, CJ Industries receives consent and quarries aggregate according to the proposal. It uses its staff and facilities to continue to operate similarly to its past operations. CJ Industries has advised that they and Concrete & Metals Tasman Bay Ltd are currently main suppliers of locally processed aggregates in the Motueka area (from south of the Tākaka hill to Mapua) and they supply as far afield as Nelson. According to the Companies Office, these two companies have overlapping ownership and directors; they are related entities. The analysis therefore assumes that the application affects the operations of both companies. CJ Industries expects that about 55 percent of its production from the quarry would be used within 25 kilometres of its site. Other aggregates (and premix concrete) are available and are carted into the area from farther away. Resource consent for the Peach Island quarry would allow local supply to continue. This is the baseline scenario, and economically it is considered a no-change scenario.
- 3.10 In the second scenario, CJ Industries will acquire aggregate from more distant sources. CJ Industries have provided information about the expected impact of this approach. The Peach Island quarry is expected to support the employment of five people: one digger driver, two truck drivers and two loader operators at the yard. Without the quarry,

they would likely not be employed by CJ Industries. In addition, river run aggregate represents about one-half of the volume processed by the company's screening and crushing plant. Without the local aggregate, the company would no longer need one machine operator, one screening operator and one crusher operator. The reduced activity would also have an impact on overhead costs. Current costs would need to be either reduced, spread across a smaller volume of sales or absorbed by the company as a loss in income. The impact would be some combination of reduced employment, higher prices and lower profits.

- 3.11 The economic impact is mainly displacement of an activity from one location to another. Without the Peach Island quarry, CJ Industries will reduce its production of aggregate and premix concrete. However, other companies outside the Motueka area will increase their production and sales to make up the difference assuming that a source of aggregate is available to them. CJ Industries will reduce its staff numbers, but other companies will hire more staff to cope with increased work. There are likely to be local economic impacts: CJ Industries estimates that 67 percent of its 83 staff live within 12 kilometres of Motueka. Their employment or their spending could move outside the area.
- 3.12 One economic impact represents an additional cost rather than a displacement. CJ Industries have estimated that obtaining aggregate from a more-distant source is possible and will add \$6 per tonne to the cost of the aggregate it uses. As described above, the distance that aggregate has to be carted is a significant factor in its cost. Although many of the economic impacts represent shifts of activity from one location to another, the extra cartage is simply extra cost. Using information on the estimated amount of aggregate and the length of the consent, it is possible to calculate the total annual increased cost of production due to the extra cartage, as shown in **Error! Reference source not found.** The increased cost is estimated to be \$190,000 per year.

Table 1 Additional cartage costs without Peach Island quarry

Measure	Quantity	Source
Aggregate per load (tonnes)	36	Pers. comm, Richard Deck, 02/02/22
Total aggregate for extraction (tonnes)	475,000	Corrie-Johnston, 2022
Years of permit	15	Average of 400,000 and 550,000 tonnes Corrie-Johnston, 2022
Average tonnes/year	31,667	
Average loads per year	880	
Extra cartage per tonne (\$)	6	Document: Peach Island Economic Justification
Annual extra cartage cost (\$)	190,000	

- 3.13 An additional economic impact is the effect on agricultural production from the site. The site contains land that is considered to have high productive value by Council, whereas Mr Nelson and Mr Hill consider that it does not meet the definition of high productive value (Hill, 2022; M. A. Nelson, 2022). It is currently used for pasture and has been so used in the past (Application for Resource Consent by CJ Industries, RM200488, 2020, p. 30). A previous owner, Stephen Allred, reported growing blackcurrants on the site, but noted that soil conditions were challenging and *Plants took 3 times longer to become established* (M. Nelson, 2022). There is a short-term loss of production while the site is being quarried. Expert advice is that the site can be reinstated and long-term productivity will not decline (Hill, 2022; M. A. Nelson, 2022). Long-term impacts have therefore not been calculated for the CBA.

### Potential effects on the environment

- 3.14 The application and supporting reports provide information about environmental impacts. For a CBA, the aim is to obtain information from other experts about the kind of environmental impacts expected and their possible size. After relying on other experts to describe potential effects on the environment, the economics expert then assigns a dollar value to those impacts to make the environmental (and social and cultural) impacts commensurable with the economic ones.
- 3.15 The application mentions flood hazards, and states that the proposal will have *less than minor effect on flood plain stability* (p. 26). The application also mentions groundwater, and states that *groundwater quality will be protected and there is no risk of groundwater drawdown* (p. 26). It also notes that *Potential impacts on groundwater are expected to be minimised* (p. 30). For these impacts, the language used – less than minor, minimised, no risk – suggests that the



environmental impacts are not large enough to warrant assigning a value. By contrast, the Section 42a report states at paragraph 12.20, *There appears to be a large disconnect between the “low risk to groundwater and surface water quality” referred to in the application documents and the concerns and experiences of the submitters, which needs to be addressed by the applicant before the Council experts and I can make any final recommendation* (Bernsdorf Solly, 2022). Expert evidence by a hydrogeologist states that, provided the quarry is operated according to the Groundwater Management Plan, impacts will be less than minor (Nicol, 2022, p. 10). Because of this guidance, I have not included the value of water impacts in the CBA.

- 3.16 One environmental effect that requires assessment results from the increased distance that aggregates would have to travel from outside the area. The distance would increase the use of fossil fuel, increasing emissions of greenhouse gases (GHG). As shown in Table 1, the number of truck trips can be estimated at 880 per year. Aggregate that would have been carted 15 kilometres from Peach Island will now be carted 29 kilometres from Richmond/Appleby or 50 kilometres from Wakefield. Assuming that half the replacement aggregate comes from each of the two alternative sources, the total number of additional kilometres travelled annually would be 21,551 ( $\approx 880 \times (14+35)/2$ ).
- CJ Industries is planning to purchase two new trucks for the quarry operation. They will have gross weights of 54 and 58 tonnes. These same trucks can be included in the second scenario to minimise differences between the two scenarios. The average gross vehicle weight would be 56 tonnes, so the additional tonne-kms would be 1,206,852. In 2018, the mean emissions intensity for heavy diesel trucks in New Zealand was 236 grammes of CO<sub>2</sub>-equivalent per tonne-km (Wang et al., 2019). The increased GHGs from carting the aggregate would be 285 tonnes CO<sub>2</sub>-e annually.

### **Potential social effects**

- 3.17 The proposal is expected to have effects that can be categorised as non-market impacts or externalities that affect the public. They can be classified as social effects. Submissions that recommended declining the consent also suggested that the following could be potential social effects:
- (a) Noise and vibrations
  - (b) Dust
  - (c) Increased danger on roads

(d) Amenity impacts on neighbouring properties

(e) Impacts on recreation, including cycling.

- 3.18 One impact will be noise from the quarrying operation. Rhys Hegley of Hegley Acoustic Consultants has indicated that the noise *will be below the levels that the Tasman Resource Management Plan (TRMP) considers appropriate*, and that noise from the quarry will be minor to less than minor while noise from truck movements will be less than minor (Hegley, 2022, p. 3).
- 3.19 A change in traffic patterns is another impact. Expert evidence indicates that the plan for the site will provide *a safe and efficient vehicle crossing* (Clark, 2022, p. 30). The evidence also discusses other issues: increased vehicle movements, the Tasman Great Taste Trail, the Alexander Bluff Bridge, road width and maintenance, and safety. The conclusion is that *The draft conditions with amendments and additions I have noted above will enable the activity to operate safely and efficiently within the existing road environment with any effects being less than minor* (Clark, 2022, p. 30). Consequently, the CBA does not include any valuation of traffic impacts, including impacts on cycling.
- 3.20 Impacts on visual amenity value of the site have also been assessed. Excavation will be limited to 1,600 m<sup>2</sup> at any one time, so the visual impact of the activity will be constrained. Additionally, in Stages 2 & 3, the stop bank will aid in limiting visual effects outside of the property through shielding works from the majority of nearby properties and it is proposed to plant vegetation along the southern and western boundaries of Stage 1 in order to limit visual effects in this area as well (Application for Resource Consent by CJ Industries, RM200488, 2020, p. 24). Expert evidence concludes that there is *overall low-moderate (minor) adverse effect on rural character and visual amenity values during the consent, reducing to low positive effect on completion of consent* (Gavin, 2022, p. 6). Because adverse effect over the 15 years of the consent is considered minor and the effect afterward is positive, the CBA does not include valuation of amenity effects.
- 3.21 Potential social impacts from the application have been identified. Expert evidence on the size of the impacts leads me to conclude that they are not large enough to warrant valuation in the CBA.

### **CBA calculations – economic impacts**

- 3.22 The above sections have (1) established the boundary for the CBA and (2) described the effects of the proposed activity. The next steps in a CBA are to quantify the impacts and assign values to them. After that, they can be aggregated and summarised.
- 3.23 The value of the economic impacts has been estimated with a model of the macroeconomy. It is a computable general equilibrium (CGE) model of the New Zealand economy maintained by NZIER and called TERM-NZ. The model was developed by NZIER, one of the oldest economics research organisations in New Zealand, and the Centre of Policy Studies (COPS) at the University of Victoria, Melbourne, an international centre of CGE modelling. COPS produced an early CGE model, ORANI, and maintains the GEMPACK modelling software used to solve CGE models. COPS researchers created the TERM (The Enormous Regional Model) model for Australia. NZIER worked with COPS to create a New Zealand version of TERM, called TERM-NZ. TERM-NZ is a static CGE model containing 201 commodities, 106 industries and 15 regions, and is solved using GEMPACK.
- 3.24 In this case, the impact being assessed is the economic impact of not having the quarry. If the quarry is consented, CJ Industries and local aggregate supply are expected to continue as before. This observation forms a baseline for the economic calculation. If the quarry is not consented, the cost of aggregate will increase, with flow-on effects to the rest of the economy. The CGE model is used to estimate the total economic impacts of that scenario. To estimate the impact, the model inputs must be changed, or ‘shocked’ in economic terminology. The shock is based on information in Table 1 showing that extra cartage costs amount to \$190,000 per year.
- 3.25 The value of rock, sand, gravel and clay for building, roading and fill is estimated at \$3.96 million annually in Tasman. The data and calculations are shown in Table 2. Population figures in Table 2 are from subnational populations at 30 June 2021 from Statistics NZ. Production figures are from the 2020 New Zealand industrial mineral production survey from NZ Petroleum and Minerals. Tasman and Nelson are aggregated in the mineral production survey results, so in this analysis the total for both is allocated to the two areas according to population. The value of aggregate production in Tasman is approximately \$3.96 million per year. The increased cost of \$190,000 per year represents a 4.58 percent loss of productivity in aggregate production in Tasman.

Table 2 Value of aggregate production in Tasman

	<b>Tasman</b>	<b>Nelson</b>	<b>Total</b>
Population (count)	57,900	54,700	112,600
Rock, sand and gravel for building (\$)	1,153,151	1,089,419	2,242,570
Rock, sand and gravel for roading (\$)	1,955,645	1,847,561	3,803,206
Rock, sand, gravel and clay for fill (\$)	850,311	803,316	1,653,626
Value of Tasman aggregate (\$)	3,959,107		

- 3.26 To assess this loss with TERM-NZ, the loss needs to be converted into a ‘shock’ to the model. In economic terms, the cost of supply has increased, so the productivity of the industry has decreased. For TERM-NZ, the shock is a productivity decrease in the Non-Metallic Mineral Mining industry. The size of the shock can be estimated as the increased cost in proportion to the size of the industry. In TERM-NZ, the scenario can be modelled by decreasing the overall productivity of the industry by 4.58 percent.
- 3.27 In TERM-NZ, Tasman District is combined with Nelson into a single economic region. However, the impacts of the change in aggregate supply are expected to be localised. The modelling therefore shocked the Tasman/Nelson combined economy by the productivity shock above. Then, the calculated percentages were applied just to Tasman District data to calculate the dollar value of impacts and the employment effects.
- 3.28 A final consideration with CGE modelling is called the closure conditions. A set of equations that describe the economy can have more variables – things we want to know – than it has equations – relationships we can describe. In order to solve or ‘close’ the model, modellers have to make assumptions about how the economy operates. These assumptions are closure conditions. Two important assumptions focus on employment and investment capital. Both of them can be treated flexibly or inflexibly. For employment, the flexible condition is that business can find employees at the current wage rate and the number of workers adjusts to changes in the economy. The inflexible condition is that the number of workers in the economy is fixed because of demographics, so salaries and wages rise and fall in response to changes in the economy. Likewise for capital investment: the flexible condition is that there is enough money available to make investments, while the inflexible condition is that the pool of investment capital is fixed. There are economic arguments for both types of closure

conditions. For this analysis, the impacts have been estimated with both closure conditions and the results averaged.

- 3.29 If the Peach Island quarry is not consented, the impact on household consumption in the short term is estimated to be a decrease of 0.020 percent in Tasman District. National household consumption for the year to March 2021 was \$203 billion and the gross domestic product (GDP) (expenditure) was \$325 billion (Reserve Bank of New Zealand, 2021), so the ratio of household consumption to GDP is 62.5 percent. For the Tasman District, GDP was \$2,425 million in the year to March 2020 (Tasman District Council, 2021), so household consumption can be estimated at \$1,516 million. A decrease of 0.020 percent represents a loss of \$306,000 per year to Tasman District households. In particular, the non-metallic mineral mining industry declines by 9.89 percent. In the TERM-NZ model, there are also declines in local fuel retailing, supermarkets, food retailing, and other retail activities. These changes reflect that lower local incomes will lead to less money circulating in the local economy. Across the District, employment is estimated to decline by 0.011 percent. Statistics NZ (2022) reported 24,906 filled jobs in Tasman District as at January 2022, so the decline represents 2.76 jobs.
- 3.30 The second economic impact is the loss in pastoral production over the short term and the long term. The total area of the site (Stage 1, Stage 2 and Stage 3) is approximately 7.37 hectares. In the short term, the impact depends on the area of pasture not being grazed in order to allow the quarrying. The area being used for quarrying – uncovered area, stockpile and service area, access route – is intended to be small. No more than 1,600m<sup>2</sup> (or 0.16 hectare) is intended to be exposed at any one time. However, the impact on area available for grazing would be larger than that.
- 3.31 The lost production depends on the carrying capacity of the pasture at the site. As the site is currently used to run beef cattle, that is the appropriate form of land use for assessing the cost of lost pastoral production during quarry operations.
- 3.32 To model the impact with TERM-NZ, the lost productive area (7.37 hectares) was introduced as a proportional shock to the sheep and beef industry in the model. Tasman District had 51,202 hectares in sheep and beef farming in 2019 (Ministry for the Environment, 2021), so the loss represents 0.0144 percent of land in that use. TERM-NZ was shocked by reducing the amount of land in that industry in the Tasman-Nelson district by that percentage. The lost household income was 0.000064 percent for the

district as a result of losing the 7.37 hectares of pasture. Output in the sheep and beef industry fell by 0.00763 percent. Employment in the Tasman District fell by 0.000036 percent (0.01 employee) and total household income in the district fell by 0.000064 percent (\$970).

- 3.33 Some submissions have mentioned both productive land and horticultural production as losses if the land is used for quarrying. As noted above, previous attempts at horticulture have found the site challenging (M. Nelson, 2022). While horticulture could be a possibility, a calculation of economic loss would need to account for the time and money required to develop the horticultural use and the quality of the site for that purpose. That is, a land parcel does not suddenly have a profitable horticulture operation from one day to the next, and soils are only one part of a commercial farm. A business plan with development costs, production and returns over time would need to be developed. This option was not explored, because there is already an existing agricultural use of the land to compare to its use as a quarry and the owner has no plans to develop horticulture on the site.
- 3.34 The long-term impact on agricultural production depends on the rehabilitation of the site. Expert evidence indicates that the site can be reinstated and long-term productivity will not decline (Hill, 2022). For this reason, economic impacts on production are calculated for 15 years to the end of the consent, at which time impacts are expected to end.

#### **CBA calculations – environmental impacts from GHG emissions**

- 3.35 As noted above, GHG emissions from increased cartage amount to 285 tonnes CO<sub>2</sub>-e annually. The price of New Zealand carbon units can be used to assign these emissions an economic value. NZ Units are currently (11 July 2022) trading around \$75 per tonne (Carbonnews, 2022; Jarden Commtrade, 2022), putting the value of the increased GHG emissions at \$21,400 per year. Expressed differently, consenting the Peach Island quarry would be the equivalent of avoiding \$21,400 in carbon emissions each year.

#### **CBA calculation – final calculations**

- 3.36 There are two additional steps in a CBA. First, the annual amounts are projected into the future and discounted to present value. For this CBA, annual amounts are projected for 15 years, the time period of the consent sought. The discount rate is five percent, which

is the standard discount rate currently recommended by the Treasury (2022). Next, the discounted benefits and discounted costs are summed and the net benefit is calculated. The net benefit is a summary measure of the value of a project or proposal. If it is above zero, the project generates more benefit than cost. For the Peach Island quarry proposal, the net benefit over 15 years, accounting for economic impacts and GHG emissions, is \$3.56 million.

### **Matters raised in s 42A report**

- 3.37 The s42A report raises the *Key issue – Effects on land productivity*. Agricultural production has physical and economic elements, so an assessment of *land productivity* should have regard for both physical and economic dimensions. An activity may be physically possible but not economically viable. The report presents a discussion of Rural 1 Zone land and productive soils as if they are consistent, homogenous classes. From an economic point of view, this is not true. The size and location of the site as well as its use over the past 40 years all suggest that the productive potential of the site from an economic point of view is low. It may be true that a greater productive potential could be ‘unlocked’ with some level of capital investment, but that investment would take resources away from other uses. Its economic potential would not be due solely to the soil.

## **4. CONCLUSION**

- 4.1 CJ Industries has applied for consents to extract aggregate at a Peach Island site. The economic benefit arises from having a local source of aggregate, and the environmental benefit arises from reduced emissions from cartage of low-value, high-bulk material. The economic cost is loss of pastoral production for 15 years. No other environmental, social or cultural impacts are included in this analysis. The total annual economic benefit is valued at \$306,000, and the total annual economic cost is \$970. The annual environmental benefit from reduced GHGs is valued at \$21,400. The net benefit of the proposed activity over 15 years is \$3.56 million.

W Kaye-Blake

15 July 2022

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